The Invention Claimed is:

1. A semiconductor laser device structure having a first surface, comprising:

a lasing section containing a laser cavity that emits a light beam propagating in a horizontal direction substantially parallel to said first surface; and

a beam-deflecting section adjoining said lasing section, said beam-deflecting section comprising a plurality of reflective surfaces arranged in an array for redirecting said horizontally-propagating light beam to propagate in a substantially vertical direction toward said first surface.

2. The semiconductor laser device defined in claim 1 wherein said lasing section and said beam-deflecting section are mechanically joined.

3. The semiconductor laser device defined in claim 2 wherein said sections have edges that are substantially perpendicular to said horizontal surfaces, and wherein said sections are mechanically joined along said edges.

4. The semiconductor laser device defined in claim 3 wherein said edges are cleaved crystal facets.

5. The semiconductor laser device defined in claim 3 wherein said edges are etched facets.

6. The semiconductor laser device defined in claim 2 wherein said sections are mechanically joined by a common substrate.

7. The semiconductor laser device defined in claim 6 wherein said sections are delimited by a trench having substantially vertical etched sidewalls.

8. The semiconductor laser device defined in claim 1 wherein said array comprises;

a first deflecting surface facing said horizontally propagating light beam: and

a second deflecting surface facing upward toward said top surface,

wherein said first deflecting surface has an orientation angle with respect to the horizontal so that it reflects said horizontally-propagating light beam toward said second deflecting surface.

9. The semiconductor laser device of claim 8 wherein said second deflecting surface is a reflector formed on a bottom surface of said semiconductor laser device.

10. The semiconductor laser device of claim 8 wherein said orientation angle is such that said horizontally-propagating light beam undergoes total internal reflection toward said second deflecting surface.

11. The semiconductor laser device defined in claim 8 wherein said first deflecting surface is a crystallographically-terminating etch plane.

12. The semiconductor laser device defined in claim 11 wherein said etch plane is a side of a V-groove shaped etch pit.

13. The semiconductor laser device defined in claim 1 further comprising an optical lens disposed on said top surface wherein said lens modifies the beam profile of said vertically-propagating light beam.

14. The semiconductor laser device defined in claim 12 wherein said lens is a refractive lens.

15. The semiconductor laser device defined in claim 13 wherein said lens is made of resist material.

16. The semiconductor laser device defined in claim 12 wherein said lens is a diffractive lens.

17. The semiconductor laser device defined in claim 1 wherein said sections are made from semiconductor substrates on which epitaxial layers have been grown.

18. The semiconductor laser device defined in claim 17 wherein said substrates are transparent to radiation at the wavelengths of said emitted light beam.

19. The semiconductor laser device defined in claim 1 wherein said beam-deflecting section further comprises a power-monitoring detector.

20. The semiconductor laser device defined in claim 17 wherein said detector is a photodiode with a metal electrode deposited on said beam-deflecting section.

21. A method of fabricating a semiconductor laser device, comprising:

forming an epitaxial multiple-layer structure on a substrate that is transparent to a lasing wavelength, said multiple-layer structure comprising:

a first cladding layer;

an active waveguide layer; and

a second cladding layer;

forming at least a deflection surface that can deflect a light beam propagating in a horizontal direction in said waveguide layer toward the bottom surface of the substrate;

forming a reflective structure on the bottom of the substrate to upwardly reflect incident light;

forming a lasing section including a laser cavity with faceted ends;

forming a beam-deflecting section including said deflection surface; and

forming a beam-correction lens on the top surface of said beam-deflecting section.

22. The method of claim 19 wherein said forming a beam-correction lens comprises forming micro-optic lenses by resist reflow.

23. The method of claim 19 wherein said forming lasing and beam-deflection sections, comprise:

cleaving adjacent pieces of said substrate for use as said lasing section and said beam-deflection section; and

rejoining adjacent pieces along cleaved facets.

24. The method of claim 19 wherein said forming lasing and beam-deflection sections, comprise etching trenches in said multiple-layer structure to delimit said sections.

25. A semiconductor laser device generating a surface-emitted output beam from a first surface of said device, comprising:

means for generating a light beam substantially parallel to said first surface;

means for first redirecting said light beam toward a second surface of said device; and

means for next redirecting said light beam toward said first surface wherefrom said light beam emerges as said output beam.

26. The device defined in claim 25 wherein said means for first redirecting comprise means for reflecting said light beam.

27. The device defined in claim 26 wherein said means for reflecting comprise means for total internal reflection of said light beam.

28. The device defined in claim 25 further comprising means for applying beam-correction optics to modify a profile of said output beam.

29. The device defined in claim 28 wherein said means for applying comprises means disposed on said first surface.

30. The device defined in claim 25 further comprising means for monitoring an output power of said device.

31. The device defined in claim 30 wherein said means for monitoring comprise detector means integrated with said device.

32. A method for generating a surface-emitted output beam from a first surface of a semiconductor device, comprising:

generating a light beam substantially parallel to said first surface;

next, redirecting said light beam toward a second surface of said device; and

then, redirecting said light beam toward said first surface wherefrom said light beam emerges as said output beam.

33. The method defined in claim 32 wherein redirecting said light beam toward said second surface comprises reflecting said light beam off an etch plane.

34. The method defined in claim 32 wherein redirecting said beam toward said second surface comprises using the phenomenon of total internal reflection.

35. The method defined in claim 32 further comprising applying beam-correction optics to modify a beam-profile of said output beam.

36. The method defined in claim 35 wherein said applying comprises using a lens disposed on said first surface.

37. The method defined in claim 32 further comprising monitoring an output power of said device.

38. The method defined in claim 37 wherein said monitoring comprises using a power-monitoring detector integrated with said device.

39. A semiconductor laser device structure having a top surface, comprising:

a lasing section that emits a light beam substantially parallel to said top surface; and

a beam-deflecting section adjoining said lasing section, said beam-deflecting section including two surfaces arranged for reflecting said light beam so that it is substantially orthogonal to said top surface.

40. A semiconductor laser device structure having a first surface, comprising:

a lasing section that emits a light beam substantially parallel to said first surface; and

a beam-deflecting section for redirecting said light beam by total internal reflection.

41. The semiconductor laser device defined in claim 40 wherein said beam-deflecting section by further reflection redirects said total-internal reflected light beam toward said first surface.

42. A semiconductor laser device structure having top and bottom surfaces, comprising:

a lasing section that emits a light beam substantially parallel to said surfaces; and

a beam-deflecting section for redirecting said light beam toward said top surface, wherein an optical path length traversed by said light beam in said beam-deflecting section before emerging from said top surface includes the distance between said top and bottom surfaces.

43. The semiconductor laser device defined in claim 42 wherein said optical path length is at least about twice the distance between said surfaces.

44. A semiconductor laser device comprising a lasing section that emits a light beam coupled into an adjoining beam-deflecting section, said beam-deflecting section comprising a V-groove shaped etch pit positioned in the path of said light beam such that said light beam is reflected off a side of said V-groove shaped etch pit.

45. The semiconductor laser device defined in claim 44 wherein said side is oriented such that the angle of incidence of said light beam incident on said side is greater than the critical angle for total internal reflection.